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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/546,936	04/11/2000	Jui-Ping Li	1056-52	4254

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EXAMINER

MOORE, KARLA A

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 09/10/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/546,936

Applicant(s)

LI ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-2, 5-6, 7-9 and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,139,642 to Shimahara et al.

3. With respect to claims 1-2, 5-6 and 9, Shimahara et al. disclose a chemical vapor deposition apparatus in Figure 1 for forming a film on a wafer in a semiconductor process comprising: an inner part (2a) and an outer part (1a) with a gas-feeding pipe (241) mounted in between the inner and outer parts, so that an gas inlet and gas outlet are formed between the inner and outer parts. The feeding gas pipe contains a plurality of holes on the side near the outer part and is oriented in a direction so that gas flow is directed toward the outer part (Figure 10; column 21, rows 41-43). Shimahara et al. teaches that the holes may be gradient (column 6, row 65 - column 7, row 4).

4. With respect to claim 8, the gas feeding pipe of Shimahara et al. has a length that is shorter than two-thirds of the inner part (Figure 10), and is self-evidently less than 70 cm.

5. With respect to claims 18-19, Shimahara et al. disclose a method for feeding a gas into the above film forming apparatus comprising feeding the gas into a space between the inner and outer part and leading the gas into the inner part along a path between the two parts (claim 20).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimahara et al. as applied to claims 1-2, 5-6, 7-9 and 18-19 above, and further in view of U.S. Patent No. 6,074,486 to Yang et al.

8. Shimahara et al. disclose an apparatus for forming a film on a wafer comprising an inner part, outer part and gas feeding pipe.

Unlike the claimed invention, the construction material for the inner part, outer part and gas feeding device are not disclosed in Shimahara et al.

Yang et al. disclose a similar apparatus for forming a film on a wafer, where they teach the use of quartz and SiC as appropriate construction materials for the inner part, outer part and gas feeding device due to their inherent properties as ceramic materials (column 6, rows 4-5 & 51-53).

It would have been obvious to one skilled in the art and therefore familiar with the properties of quartz and SiC to modify the teachings of Shimahara et al., by including them as construction materials for the inner part, outer part and gas feeding tube of the claimed invention.

9. Claims 10-12, 14-17 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimahara et al. as applied to claim 1-2, 5-6, 7-9 and 18-19 above, and further in view of U.S. Patent No. Re. 36,328 to Miyashita et al.

10. Shimahara et al. disclose an apparatus for forming a film on a wafer comprising an inner part, outer part and gas-feeding pipe. The apparatus further comprises a flow controller (247), a heating device (212) and a pumping device (2D).

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Unlike the claimed invention, Shimahara et al. do not disclose the optimum process conditions for using the apparatus.

Miyashita et al. disclose a similar apparatus for forming a silicon nitride film (column 2, rows 27-30) on a wafer using nitrogen as the purge gas (column 3, rows 57-59), where additional details on optimum process conditions are disclosed. The apparatus of Miyashita et al. is capable of the claimed flow rates, process temperatures and process pressure (column 4, rows 47-49). Additionally, the invention of Miyashita et al. includes the claimed temperature differential between the feeding gas and inner part. The gases of the invention are fed at a low temperature, approximately 30-180°C, in the lower portion of the apparatus and are then processed at a higher temperature within the inner part, approximately 780°C (Figure 3, column 4, rows 7-13 & 47).

11. It would have been obvious to one skilled in the art to modify the invention of Shimahara to include the optimized process conditions disclosed in Miyashita et al. to provide a semiconductor manufacturing apparatus that can produce silicon nitride films having identical thickness and qualities.

12. With respect to claim 13, the exact length of the gas feed tube would be determined by the relative size of the overall apparatus. The courts have ruled that where the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir 1984), cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984).

#### ***Allowable Subject Matter***

13. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

14. Claim rejections under **35 USC § 112** are withdrawn.

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15. Applicant's arguments filed 5/28/02 have been fully considered but they are not persuasive. With respect to claims 1-2, 5-9 and 18-19 which are anticipated by Shimahara et al., Examiner acknowledges Applicant's contention that the Shimahara et al. fail to teach or even hint at a gas feeding pipe comprising one or a plurality of openings facing in the direction of the outer part. However, Examiner disagrees with this contention. Figure 1 of Shimahara et al. clearly shows that the outer part (1A), a u-shaped structure, extends around the sides and the top of the inner part (2a) and a gas-feeding tube (1C, between the inner and outer parts) with an opening (1c) facing the top portion of the outer part. Therefore, any gas flowing from the opening in the gas-feeding tube in an upwards direction will indeed be flowing in the direction of the outer part. Additionally, the outward flow of the gas can also be seen, either explicitly or implicitly, in Figures 2 and 5-11.

16. With respect to paragraphs 2-3 on page 5 of the amendment and paragraph 1 on page 6 of the amendment, Examiner is unclear on what exactly Applicant is pointing out. Applicant refers to Figures 2(A) and 2(B) of Shimahara et al. which do not exist. Comments were considered in light of the existing figures of Shimahara et al., however, the comments were still unclear, and therefore unconvincing.

17. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

18. In this case, claims 3-4 are rejected using the combination of Shimahara et al. and Yang et al. Motivation for this combination is found in Yang et al. column 6, rows 4-5 and 51-53, where Yang et al. teach the use of quartz and SiC as appropriate construction materials for the inner part, outer part and gas feeding device due to their inherent properties as ceramic materials.

19. With respect to claims 10-12, 14-17 and 20-22, which were rejected using the combination of Shimahara et al. and Miyashita et al., the motivation can be found in column 2, rows 27-30; column 3, rows 57-59; column 4, rows 35-38, 47-49; and column 2, rows 50-55, where Miyashita et al. teach optimum process conditions for providing homogenous films on wafers.

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***Conclusion***

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km  
September 6, 2002

  
**GREGORY MILLS**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 1700**

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*Election/Restriction*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-11, drawn to an apparatus, classified in class 118, subclass 715.
  - II. Claims 12-17, drawn to a device, classified in class 261, subclass 76.
  - III. Claims 18-22, drawn to a method, classified in class 427, subclass 248.1.
2. The inventions are distinct, each from the other because of the following reasons:
3. Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the apparatus for forming a film does not require the use of the gas feeding device as claimed. The subcombination has separate utility such as for use in etching.
4. Inventions (I, II) and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used to practice another and materially different process such as etching.



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5. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

6. During a telephone conversation with J. Warren Whitesel on September 27, 2001, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-11.

Affirmation of this election must be made by applicant in replying to this Office action.

Claims 12-22 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(I).